

LONG LIFE TO
TOOLS

SINCE



1857

KLEIN

PROPER CARE OF TOOLS AND SUGGESTIONS FOR THEIR SAFE USE

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BROKEN TOOLS
ARE A BREAK
FOR HITLER

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INTRODUCTION

Taking care of tools is good business. In the first place, good tools in proper condition assure better work. In the second place, they offer a definite safety advantage and protect both workman and work from injury. In the third place, proper care and use increase the length of useful service.

Care of tools has *always* been important though often overlooked. Today it is a "must." Mechanized war demands hand tools in almost unheard-of quantities. On the home front it is the duty of all of us to see that the tools we have are made to last as long as possible, for today tools damaged or lost may not be replaceable.

Tools are a basic factor in winning the war. Not a tank, plane, ship or gun can be built or operated without them. It takes pliers, screw drivers, chisels, wrenches by the ton to keep a mechanized army rolling.

This booklet has been prepared to help you increase the life of your tools and equipment. It contains much information that every good lineman, electrician and mechanic already knows. To them it will serve as a reminder. But, if every one of us will follow the simple suggestions given, the result cannot help but be a worthwhile contribution to the war effort.

PLIERS

Klein pliers are forged of high grade steel, tempered to provide the proper spring in the handle, with knives sharpened to assure a clean, smooth cut.

Properly used, they will give years of satisfactory service, even under the tough duty to be expected in line work. Like any tempered tool, they can be quickly ruined if placed in a flame or near excessive heat. Holding a wire or a plate in a flame by pliers is apt to draw the temper from the pliers and it is a practice that cannot be too strongly condemned.

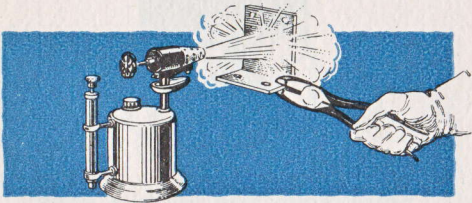


FIG. 1

DON'T HEAT PLIERS

Another form of abuse that is common is using pliers as a hammer. Pliers may be easily cracked or broken under such treatment and there is added danger of nicking the blades, making the pliers unfit for cutting.

The few seconds necessary to pick up a hammer for such a job are well repaid by the protection afforded pliers.

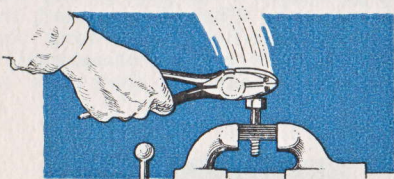


FIG. 2

DON'T USE PLIERS AS A HAMMER

Pliers are a fine tool and should be handled carefully. One of the greatest hazards a pair of pliers encounters is dropping them from a pole onto a sidewalk or paved road. Not only is this dangerous to workmen or persons passing underneath the pole, but many times such mishaps will break the handle or jaws, rendering the pliers unfit for use. In other instances, the handles or jaws may appear to be undamaged, but a small crack may be started

which days or even weeks later will develop into a break when force is applied to them.

Another abuse frequently met with is extending the length of handles to secure greater leverage. This is very apt to cause breakage and should never be done. Either use a larger pair of pliers or a bolt cutter.

There are many sizes and types of pliers, each designed for specific use. While pliers are flexible in their adaptability and a single pair can be used for a large number of jobs, care should be used to see that

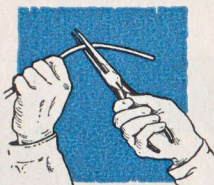


FIG. 3

DON'T BEND TOO STIFF A WIRE
WITH PLIERS

the proper size is used for pliers can be overloaded and trying to cut too large a wire with too small a pair of pliers can easily ruin them. Long nosed pliers with needle points can be spoiled by trying to bend too large a wire with the tips of the pliers—this job requires a sturdier tool.

CARE OF PLIERS

When pliers are not in use, it is a good idea to give them a rub with an oily cloth to prevent rust. When thus treated, they will remain rust-free for a long time. When in use, a drop of oil occasionally at the hinge will lengthen their life and assure easy operation.

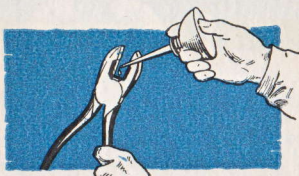


FIG. 4

OIL PLIERS OCCASIONALLY

In cutting wire, particularly high strength strand or the steel core of ACSR with side-cutting pliers, the cut should be made around the wire with the cutter knives at 90 degrees to the wire. The

pliers should never be rocked from side to side or the wire bent back and forth against the knife. The knives were never intended to take this side strain. There is

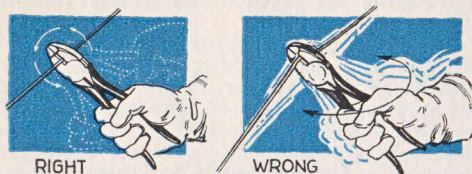


FIG. 5

CUT AT RIGHT ANGLES—DON'T ROCK

a great danger of nicking or chipping them which will result in another pair of ruined pliers.

If cutting edges of the blades become dull, they should not be filed or ground but may be touched up with a small carborundum stone, of fine grain.

LEATHER BELTS AND STRAPS

Leather belts and straps are too often neglected. Sometimes this is from ignorance but frequently from plain carelessness, yet with high grade harness leather growing scarcer, (particularly the heavy kind such as used in safety straps), the care of belts and straps becomes even more important.

Heat is the most common enemy to leather, but water, mineral oils or acids can also cause trouble. If leather becomes rain soaked, it should be allowed to dry out slowly at room temperature. Belts or straps should never be hung near a radiator, steam coil or other source of heat.

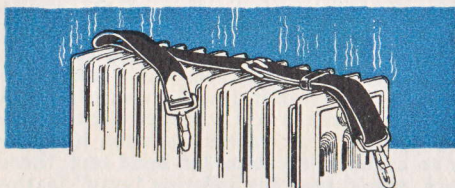


FIG. 6

DON'T SUBJECT TO HEAT

A temperature of 158 degrees Fahrenheit will glutinate the fibres and destroy the tensile strength and utterly ruin harness leather. Heat under any circumstances is

bad, but it is particularly injurious when leather is water-soaked. Under such conditions heat will vaporize water into steam within the structure of the leather itself, parboiling the leather and totally ruining the strap or belt.

When properly cared for, belts and straps will last a long time and stand necessary rough wear. It is a good idea to apply a light coat of pure neatsfoot oil to the hair or grain side of the leather while it is drying. In any case, after the leather is dry, it should be given a light dressing of neatsfoot oil—the oil should be applied by saturating a rag and rubbing the strap with it. Oil should not be flushed onto the strap from the can or the leather

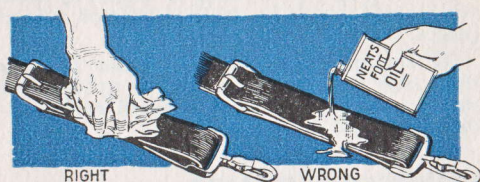


FIG. 7

OIL LEATHER OCCASIONALLY—
DON'T FLOOD

may become over-lubricated and the belt or strap become flabby or stretchy. The neatsfoot oil dressing is recommended at periods of about 90 days whether the leather has been wet or not.

An occasional washing of a strap or safety belt with saddle soap is also an excellent preservative for leather, both black and russet. The washing will remove small gritty particles from the surface and the soap itself will help keep the leather pliable. Use saddle soap as directed by the makers.

When a leather strap or belt is bent abruptly, it may crack on the grain or hair side. This is no indication of the quality of the leather. The strength fibres lie below the grain and are unaffected by the cracking of the surface. As a matter of fact, "stag" leather (leather from old animals), because it has a looser texture than high grade steer leather, is much less likely to crack. This so-called bend test, therefore, would pass the inferior "stag" leather while rejecting the high grade steer leather.

The bend test is valuable in inspecting leather that has been burned or dried too quickly. However, the strap being used in the test should not be bent more sharply than over a three quarter inch mandrel.

Bend leather slowly at room temperature and avoid sharp, quick bends, especially in cold weather, and *never* bend the leather abruptly at a buckle hole as it will invariably show cracks around the hole.



FIG. 8

OIL SNAPS AT LATCH

In taking care of leather belts and straps, D-rings and snaps should not be overlooked. If belts and straps are not in use, it is well to rub all metal parts with an oily cloth to prevent their rusting. Snaps should be oiled at the keeper hinge and a drop of oil should occasionally be placed on the operating spring. Unless a snap closes smartly and unfailingly on the D-ring, there is danger of accident, and oiling the snap is one of the best safeguards to assure proper operation. Snaps should be oiled every 60 or 90 days.

Safety Note

Make a habit of "testing" your belt and safety strap every morning before starting the day's job. Get on the pole, but stay close to the ground. Pass safety strap around pole and attach at D-ring. Now pull yourself close to the pole and from that position throw yourself smartly back so as to bring the full strain on the strap and belt. Some men habitually do this every time they have to climb—no matter how many times a day. It is a good habit—and we commend it.

SAFETY STRAPS OF KLEIN-KORD FABRIC

While the development of Klein-Kord safety straps has aided materially in the conserving of high-grade harness leather, Klein-Kord offers many marked advantages of its own. For the first time, a safety strap is now available which offers a positive visual warning when its limiting factor of safety is arrived at.

The center plies of every Klein-Kord strap are red, and the strap is safe to use

until red shows on the surface. When this happens, the strap should be discarded. Red is the danger signal.



FIG. 9

STOP WHEN YOU SEE RED

This fabric strap compares favorably with leather from a safety and wear standpoint. It is made of multiple plies of special weave long staple cotton, and these plies are calendered in rubber and vulcanized under pressure. The special weave of this strap permits the use of a positive acting tongue buckle far superior to any friction type buckle, as the latter will occasionally slip under tensile loads. As the strap wears, the friction buckle has increasing tendency to slip, and even if no accident occurs, a slight slip, particularly when a lineman is working on a tall stick, is extremely uncomfortable.



FIG. 10

TONGUE BUCKLE ASSURES SAFETY

Caring for a strap of Klein-Kord is quite different from caring for leather. As it originally comes from the factory, Klein-Kord has an outer coating of rubber.



FIG. 11

USE KLEIN-KORD DRESSING

Under friction against a pole, this rubber coating gradually wears off. When it is worn, Klein-Kord dressing should be applied lightly and permitted to dry into the fabric. Drying requires about an hour. After drying, a second coat should be applied. This dressing adds materially to the life of the strap. Do not use varnish or any dressing other than special Klein-Kord dressing.

CLIMBERS

Klein Climbers are made of highest grade spring steel designed and shaped to assure maximum safety and greatest comfort to the user. The gaffs are of tempered steel and should be properly treated. The greatest cause of damage to climbers is carelessness. When through for the day, some linemen bundle climbers with the leg straps and pitch them into the truck. Such treatment is likely to damage the steel gaff, or, even worse, it may start a crack in the gaff which is invisible at first but which develops later into a break. When a lineman's life depends upon his climbers, only the best of treatment is good enough for them.

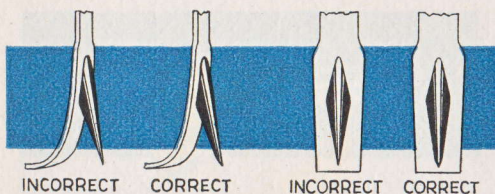


FIG. 12

Climber gaffs should be properly sharpened.

Always use a sharp file. **NEVER** grind to a point on any kind of wheel as you are likely to set up heat which will spoil the temper of the gaff and make it dangerous.

Set climber in vise with gaff uppermost so that you can file from heel to point of gaff.

Remove only sufficient material to obtain a good point.

Do not make a needle point, but leave a shoulder about $\frac{1}{8}$ " back from the point, and from there work over to the point. At the shoulder you should have a width of approximately $\frac{5}{32}$ ".

If necessary to remove any metal from underside of gaff, be careful not to round

off towards the point or you may find a tendency to "cut out" when climbing. The underside of gaff should be left perfectly straight.

NOTE: Safety Engineers recommend that climbers should not be used after the gaffs are worn to $1\frac{1}{4}$ " (measured on the underside).

When your climbers get in this condition they should be regaffed or a new pair obtained.

By following these simple directions a satisfactory job can be secured.

GRIPS—WIRE

Grips of proper design clamp onto the wire and hold tight. The harder the pull—the greater the leverage the grip exerts. To assure maximum efficiency and avoid slippage, the grooves of the jaws should be kept free from grease, oil, or accumulation of spelter. Fine emery cloth will clean the jaws, or a file may be used, but care must be exercised to prevent filing away the surface, thus changing the shape of the groove.

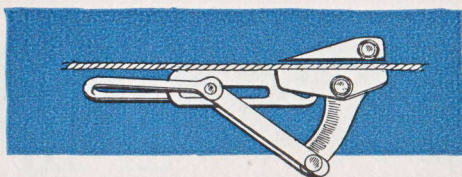


FIG. 13

Grips should be handled carefully, not thrown into a box or a truck, and never dropped into mud or sand. The bearing points should be oiled frequently, as this will help keep the grips working smoothly and prevent unnecessary wear.

ROPE

Rope may well be considered an important "tool" in the electrical industry. Today, Manila rope is "out" so far as civilian use is concerned. With many of the sources of supply for the raw product of rope in enemy hands and with the need of the Army and Navy for high grade rope growing by leaps and bounds, many concerns owning Manila rope today have a treasure almost beyond price. Take care of this rope. It's good business.

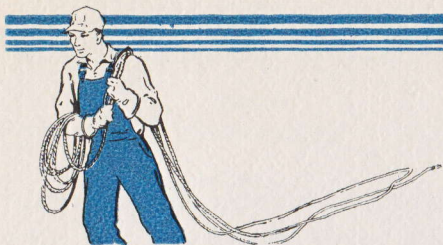


FIG. 14

ROPE SHOULD BE CARRIED—NOT DRAGGED

Rope should never be dragged along the ground or over the floor. This is extremely damaging and causes unnecessary wear.

Rope should always be cleaned before storing and when stored, it should be dried thoroughly at room temperature and should be kept in a dry place. In use, it should not be pulled

in kinks and care should be used to see that only pulleys of the correct size for the rope are used.

Below is a table showing the size rope to be used with various pulley diameters.

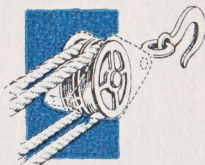


FIG. 15

**USE PROPER
SIZE PULLEYS**

ROPE DIA.	SIZE, INCHES PULLEY CIR.	ROPE STRENGTHS IN POUNDS	
		BREAKING	WORKING
$\frac{3}{8}$	$1\frac{1}{8}$	1,350	230
$\frac{1}{2}$	$1\frac{1}{2}$	2,650	530
$\frac{5}{8}$	$1\frac{3}{4}$	3,450	690
$\frac{3}{4}$	2	4,400	880
$\frac{13}{16}$	$2\frac{1}{4}$	5,400	1,080
$\frac{7}{8}$	$2\frac{1}{2}$	6,500	1,300
1	$2\frac{3}{4}$	7,700	1,540
$1\frac{1}{8}$	3	9,000	1,800
$1\frac{1}{4}$	$3\frac{1}{4}$	10,500	2,100
$1\frac{5}{8}$	$3\frac{1}{2}$	12,000	2,400
$1\frac{3}{4}$	$3\frac{3}{4}$	13,500	2,700
$1\frac{7}{8}$	4	15,000	3,000
$1\frac{1}{2}$	$4\frac{1}{2}$	18,500	3,700
$1\frac{5}{8}$	5	22,500	4,500
$1\frac{3}{4}$	$5\frac{1}{2}$	26,500	5,300
2	6	31,000	6,200

Sharp bends in rope should be avoided and it should always be fastened to large smooth surfaces. It is important to see that blocks or sheaves are properly aligned so that rope does not rub over the edges of the block. Rope should never be put over sharp edges of beams or girders

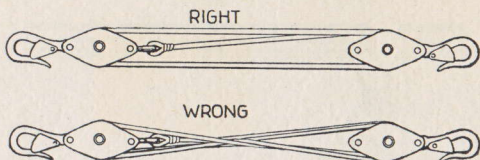


FIG. 16

AVOID RUBBING TO PREVENT WEAR

which causes unnecessary wear. Rope should not be overloaded and sudden jerks or strains should be avoided.



FIG. 17

If rope becomes worn at one end or in a short section, reverse the ends so that the wear is localized at another point. This should be done before damage to the rope occurs. If rope is damaged cut out bad spots and splice it.

WRENCHES (Adjustable)

Adjustable wrenches are sturdy tools and are designed to do one job—to tighten and loosen bolts and nuts. However, sturdy as they are, wrenches can be easily abused and the most common cause of failure is abuse and neglect. Wrenches should be kept clean and a drop of oil should be placed occasionally on the pin and on the sliding jaw. Dirt and rust accumulating on the knurl make wrenches hard to operate. Keep them clean.

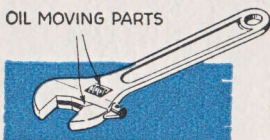


FIG. 18

It is not uncommon to see a wrench used as a hammer. This not only batters the head of the wrench, but is liable to break it or damage it beyond repair.

Handle lengths are properly computed to provide safe leverage for the size of the wrench. Extending the length of the

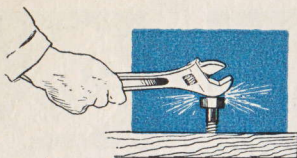


FIG. 19

A WRENCH IS NOT A HAMMER

handle by slipping a piece of pipe over it to increase the leverage is overloading the wrench and increases the danger of

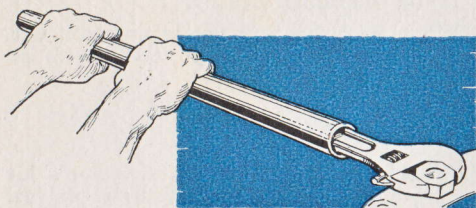


FIG. 20

DON'T EXTEND LENGTH OF HANDLE

breakage. If the wrench being used is not of sufficient leverage, a larger size wrench should be obtained.

Wherever possible, wrenches should be turned in the direction indicated in the sketch. This is designed to put the great-

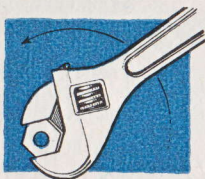


FIG. 21

TURN WRENCH IN THIS DIRECTION

est load on the solid part of the wrench instead of on the sliding jaw. In tight quarters, however, where it is unavoidable, the wrench may be reversed, but too much pressure applied in this position is likely to cause damage.

It is important that the jaws of the wrench be tight on the nut that is being turned. This not only prevents battering the head of the nut, but it is also a safeguard against the wrench slipping, and

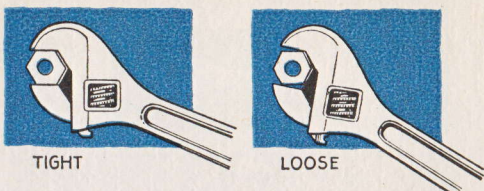


FIG. 22

JAWS SHOULD FIT SNUG

will prevent bruised knuckles, skinned fingers or perhaps more serious injury to a fellow workman nearby.

When wrenches are not in constant use, it is a good plan to wipe them with an oily cloth to prevent rust.

SCREW DRIVERS

Probably no tool in the electrician's kit is more abused than the screw driver. Screw drivers are designed for one purpose—to drive or back out screws. Using them as a pinch-bar is very apt to bend the shank or loosen the handle. They are not designed for this kind of work. Screw drivers should never be placed in flame or

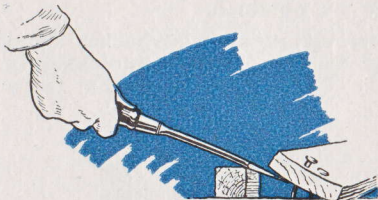


FIG. 23

DON'T USE AS A PINCH BAR

in hot solder as it draws their temper and renders them useless. Screw drivers should never be used as chisels. This is liable to chip the blade, bend the shank and ham-

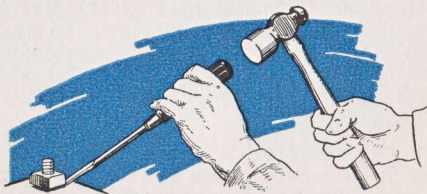


FIG. 24

DON'T USE AS A CHISEL

mering on the handle is apt to split it or batter it, making the tool dangerous for further use.

The proper size screw driver should always be used. The following illustrations show what is apt to occur if a screw driver too large or too small is used instead of one of the proper size. (Below, we show illustrations of a screw driver with too narrow a blade, a screw driver with too

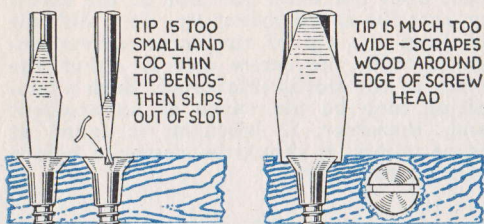


FIG. 25

thin a blade and a screw driver with a broken blade.) In selecting the proper size screw driver, the following table will assist in assuring the proper size of driver for the screw it is intended to turn.

Size of Screw Driver	Size of Screw
3" cabinet screw driver	# 4 to # 6
6" cabinet screw driver	# 5 to # 8
4" regular screw driver	# 6 to #12
5" regular screw driver	#14 to #18
Bit Brace screw driver	#14 to #18

In turning the screw driver, keep the center line of the driver in line with the

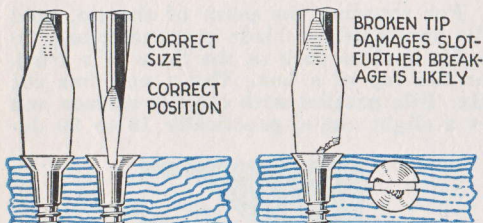


FIG. 26

center line of the screw. Hold the end of the blade squarely against the bottom of the screw slot in order to prevent damaging the screw. Use two hands when starting screws, one on the handle of the screw driver to do the turning and the other on the blade to steady it on the screw. Avoid injury by keeping the

hands, head and arms in such a position that they will not be struck with the tip should the screw driver slip. Remember that the tip of the blade will have the greatest tendency to slip out of the screw slot just before each turn is completed, especially the last turn.

If difficulty is being experienced in turning screws in hard wood, lubricate the threads with soap or beeswax, taking care particularly in hot weather that the lubricant does not enter the slot of the screw or coat the screw driver tip. It is difficult to keep the tip of the screw driver engaged with the screw slot if either the blade or the slot is lubricated. Such a condition may be the cause of an accident and, therefore, if lubricant is found at these points, it should be removed before turning the screw.

Re-pointing Blade

The tip of the blade of the screw driver should be kept properly shaped at all times. The following methods should be used in re-pointing the tip:

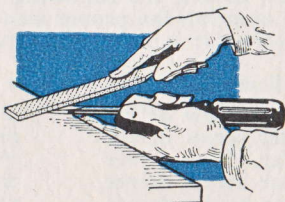


FIG. 27

KEEP BLADE SQUARE

For squaring the point of the tip, hold the screw driver blade perpendicularly to a flat surface such as the floor of a truck or the top of a box. Use a new fine cut file. File parallel with the flat surface and at a slight angle, practically 20 to 30 de-

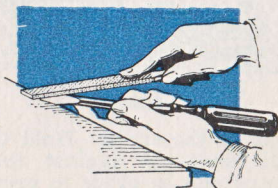


FIG. 28

KEEP BLADE SHARP

grees. (See Fig. 27.) Grasp the file securely so that it can be easily steadied

and its movement controlled at all times. Move the file forward and parallel to the flat surface applying sufficient pressure for the teeth to bite the metal. The pressure should be evenly distributed and maintained throughout the forward stroke. On the return stroke, the file should be held slightly above the surface being filed in order not to dull the cutting teeth by dragging back over the steel and continue filing until broken, chipped or rounded edges have been removed. The finished edge should not be sharp but left at the proper thickness to fit the slot of screw sizes in use.

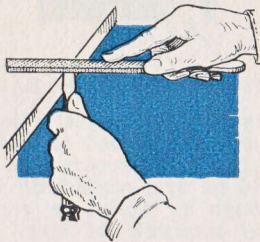


FIG. 29
DRESS EDGES OF BLADE

With the screw driver and file held in the position such as shown in Fig. 29, dress down the edges of the tip restoring the width of the point to its original size as closely as possible.

Take Precautions

Observe the following precautions when using screw drivers:

- a) Do not use a screw driver with broken, chipped or rounded point.
- b) Do not carry screw drivers in pocket where injury may result through exposure of the point of the blade.
- c) Do not use screws with damaged slots. Burred screw slot often causes screw driver to slip, resulting in accident.
- d) Work with the screw driver in such a position that if it slips, it will not injure the hands, face or eyes. If it is necessary to hold objects such as transmitters in which screws are to be placed or from which they are to be removed, the hand should be kept away from the back of the object so that it will not be struck if the screw driver slips.

PIKE POLES, SHOVELS, ETC.

Any tool or equipment having a wood part should be inspected constantly to make sure that it is not split or splintered. The wood on such tools can be preserved

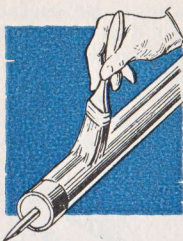


FIG. 30

PAINT OR OIL WOODEN HANDLES

by painting, or where paint is not satisfactory, a coat of $\frac{2}{3}$ boiled oil and $\frac{1}{3}$ turps can be applied as a preservative. The surface should be first sanded off to get rid of any rough or splintery edges. Such dressing at intervals of sixty days will extend indefinitely the period of useful service of the tool or equipment in question. The wood fibre is fed by the oil and enough will remain to harden on the surface and provide an excellent protection from water. Any wooden part that shows splits or cracks should be discarded. It is dangerous to wire or tape up parts as such repair cannot be depended on for heavy strain.

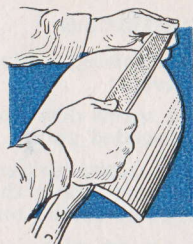


FIG. 31

KEEP POINTS AND EDGES SHARP

The points of pike poles, edges of shovels, etc., should be kept sharp. Care should be used in grinding or filing these to avoid heat—which draws the temper from the blades or points. If pike poles, shovels, etc., are not used constantly they should be cleaned off thoroughly and a coating of oil applied to the metal parts to prevent rust.

AXES

The axe is a tool that linemen frequently have occasion to use. Naturally, weight, size and shape of axes vary and in different sections of the country different styles of axes are preferred. Personal taste has much to do with dictating the type of axe best suited to any individual use. A narrow axe with a thin blade, however, is best for hard wood, while a wide axe with a thicker blade can be recommended for soft woods.

In grinding an axe, use a wet grindstone with plenty of water to get it in shape. Grind the blade of the axe flat to the required thickness on both sides, but not too thin or the axe will break. Start your grind about three inches back from the cutting edge and work for a fan-shaped effect as shown in the illustration Fig. 32. Carry this grinding down to within one-half inch of the edge, then roll off a bevel, making it a gradual taper from a point half an inch from the edge down to the cutting edge. Such a bevel throws the chips and prevents breakage of the blade. After the axe has been gotten into shape the first time, the grindstone should never be used again. Use a file to keep it sharp and down to the required thickness.

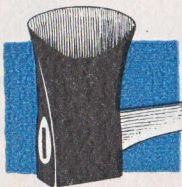


FIG. 32

FILE AXES WITH FAN SHAPE BLADE

For this purpose, the ideal file is a flat file with a coarse fast cutting edge on one side and a smooth side for finishing. Special files are made for sharpening axes.

In filing an axe, the file should be held level with the blade (see Fig. 33), and you should begin filing the flat of the blade at the top of the roll or one-half an inch from the edge. From this point, file away the flat of the blade to a point about three inches back from the edge. Work for the fan-shaped effect as shown in the accompanying figure as this style of grind is serviceable in practically all kinds of wood. Use the double cut or fast cutting side of the all work file for this purpose

and stroke from the edge back toward the head of the axe. File only on the forward stroke, lifting the file clear of the axe on the return stroke.

Do not file the flat of the blade farther back than the three inches mentioned, or your axe will stick in the wood or the vibration will break it, as it has no support against the sides of the cut.

Now file the bevel, using the single cut or smooth side of the file. Start filing at a point one-half an inch from the edge and roll the bevel down to the edge, always sending your file strokes toward the head of the axe.

After filing the bevel, go over the flat of the blade with the smooth side of your file to remove any coarse scratches.

Now reverse your axe and proceed in the same manner with the other side. Each time you file your axe, start back on the flat of the axe as explained, before you file the bevel. Thus, you will keep the same proportionate thickness of the bevel and blade. If you merely file the bevel, your blade will soon be stubby and the axe will not sink into the wood.

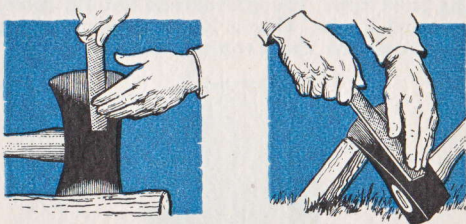


FIG. 33

HOW TO HOLD AXE WHEN FILING

To hold the axe when filing, drive a peg into the ground and rest the blade of the axe upon it. To file a single bit axe, see illustration. A notch could also be cut into a stump and the head of the axe driven into it so that it is held securely. A double bit axe can be held firmly by driving it into a log. After each sharpening and every time you are about to use the axe, hone it. Honing is often neglected as it is seldom realized that the few minutes spent in honing are more than made up by the time and labor saved in a sharp, well honed axe.

A hard fine grit stone is best for this purpose. Hold the head of the axe as shown in Fig. 34 and rub the stone over the axe edge from heel to toe with

a revolving motion, beaming the stone forward slightly. Then turn the axe to position shown in Fig. 35 and repeat the revolving motion from toe to heel on the opposite side of the blade. The first operation turns the burr or wire edge to the far

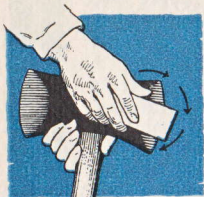


FIG. 34

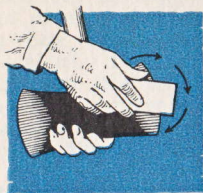


FIG. 35

GOOD HONING SAVES LABOR

side and when you reverse the axe, the stone cuts it off, provided it travels across the blade in the opposite direction. A honed axe will cut fast and stay sharp while an edge with the burr left on will flatten out, sew you up and induce crumbling along the cutting edge.

Pointers on Axe Sharpening

Grind your axe slowly. When using a grindstone, be sure to use plenty of water.

Never grind an axe on an emery wheel or dry stone as this destroys its temper.

Always hone your axe before using and increase your chopping speed.

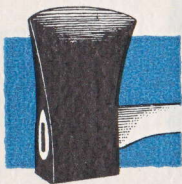


FIG. 36

KEEP BEVEL FAN SHAPE—NOT TOO STEEP

If no grindstone is available to get your axe into shape the first time, a file may be used in the same way as described for sharpening.

Always work for a fan shaped effect on the blade of the axe as shown in the accompanying illustration. An incorrect method is illustrated in Fig. 36 where the bevel is too steep and the file has been run across the blade instead of back toward the head.

Refitting Handles in Axes, Hammers, etc.

Keeping handles tight has always been a problem. No matter how tightly a handle may be wedged in the factory, after the tool has been in use for a while, both usage and shrinkage will loosen it. In a damp place, a handle will stay tight longer than in a warm, dry place. Sometimes, tapping the wedge will take up the shrinkage and sometimes the head of the tool can be driven back a little onto the handle and the end of the handle cut off.

Eventually, of course, any tool will have to be rewedged. In doing this, pick out the wedge and drive off the handle. If the wood of the handle is not bare against the head eye at all points above the handle, shave it until it fits snugly. Now place the head of the tool on the handle and sight along the handle to be sure that the head is the direct center line. See Fig. 37. Now drive in the new wedge and the tool is ready for use.



FIG. 37

KEEP
BLADE
IN LINE
WITH
HANDLE

COLD CHISELS

Cold chisels are usually forged from high carbon steel and their cutting edges

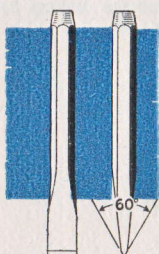


FIG. 38

BEVEL SHOULD
BE 60°

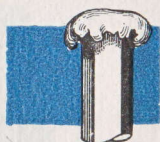


FIG. 39

FILE OFF
MUSHROOM HEADS

are hardened and tempered. It must be remembered that cold chisels are designed to cut only metal softer than the tool itself. Hardened steel such as drill rod, hack saw blade, etc., cannot be cut with a chisel. In selecting a chisel, use one large enough for the job. The center of the blade should be used rather than the point or corner. It is desirable to use a heavy hammer, as a light hammer tends to burr

the chisel head and will not transmit enough force to the cutting edge to assure a good, clean job.

Burrs (mushrooms) on chisel heads are dangerous and should be ground off frequently. Rounded, burred edges are apt to cause the hammer to slip, resulting in injury to the work or to the workman. The burred or mushroom edges, too, are apt to spall off with risk to others as well as yourself. In grinding cold chisels, the two beveled surfaces should be about 60° . On softer materials, a sharper point may be used, but in general a 60° angle has been found to be the most practical. In grinding, be careful not to overheat the cutting edge, for this will cause the chisel to lose its temper.

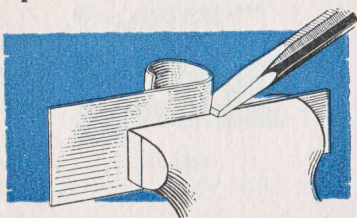


FIG. 40
SHEARING LIGHT METAL

When shearing with a cold chisel, the vertical angle at which the tool is held should be such that one bevel of the cutting edge is parallel to the shearing plane. The illustration, Fig. 40, shows the proper method of shearing light metal. Ordinary cutting with a cold chisel involves the use of an anvil or solid metal back plate. Lay the piece to be cut on an anvil and with the chisel held perpendicular to the work, strike light hammer blows at first. After the initial groove has been started, hard blows with a heavy hammer should follow. Usually, the piece should be cut part way through from both sides and finally parted by bending back and forth.

It is a good plan, when chisels are not in use, to rub them with an oily cloth to prevent rust.

FILES

Select the right file for the right job. For general work, a mill file 8" or 10" long is a favorite. Selecting the right file will improve efficiency, save time, increase production, conserve valuable material, reduce waste and spoilage, and also assure longer life to the file itself. Never use a file without a handle as there is considerable danger of driving the tang into the

palm of the hand and this may mean a major injury. In filing, don't "tear" into the work with too much pressure on the forward stroke and don't drag the file back under needless pressure. "It's steady does it."

File teeth have cutting edges and throwing them into a box with other tools is liable to damage this edge. Files should be carefully put away where they will not rub against other files or other tools. Keep files dry so that rust will not corrode their cutting edges. Files should be cleaned after every use. Tapping the file on a wooden object will help loosen the chips and the file should be brushed frequently with a file brush or card. Files should always be cleaned before being put away.

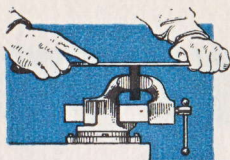


FIG. 41

CORRECT GRIP FOR LONG FILE WORK

Fig. 41—The correct grip for medium or long file work where the mechanic wishes to remove a considerable quantity of metal very quickly.

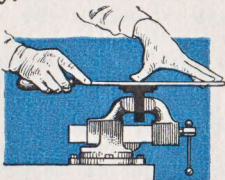


FIG. 42

CORRECT POSITION FOR FLAT FILING

Fig. 42—This position is used for flat filing. Pressure can be distributed evenly over the tool and any unevenness can be readily detected.

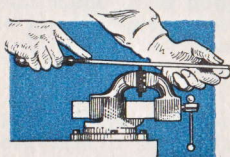


FIG. 43

CORRECT POSITION FOR ACCURATE FILING

Fig. 43—For very accurate work or for filing curved surfaces, this grip allows maximum control. Smaller files are also held in this manner.

